

NEW CANADIAN OIL AND GAS DISCLOSURE LEGISLATION: THE FIRST YEAR

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Comparison of Reserves Classifications (after Cronquist, 2001)

COUNTRY/ORGANISATION	TYPE	METHOD	PROVED P1	PROBABLE	P1+P2	POSSIBLE	P1+P2+P3
AUSTRALIA BuMin	CF	D					
AUSTRALIA Min & Energy	CF	P	P93		P60		P5
AUSTRALIA Nat Energy Adv Coun	A		Identified	Demonstrated		Inferred	
AUSTRIA	CF	P	P90	P50 - P90		<P50	
BRAZIL	CF	P					
CANADA CIM 1994	CF	P	P80		P40		P10
CANADA ASC NP2B	CF	D					
CANADA CIM 2001 Entity	CF	D	High degree				
CANADA CIM 2001 Reporting	CF	P	P90		P50		P10
DENMARK Companies	CF			Unproved			
DENMARK Government	CF			Probable			
ECUADOR Ministry	CF						
ECUADOR State Oil Co.	CF						
FRANCE	CF						
GERMANY	CF						
INDIA	A						
IRAN	CF	P					
MALAYSIA	CF						
MEXICO	CF						
NETHERLANDS	CF	P	P90		Unproved		
CHINA	A						
SPAIN	CF						
UK	CF	P	Virtually certain	> P50		< P50	
USA SEC	CF	D					
SPE/WPC Deterministic	CF	D					
SPE/WPC Probabilistic	CF	P	P90		P50		P10
FSU	A		A+ B+ part C1	Part C1		Part C1 + Part C2	
VENEZUELA	CF			Semi-Proved			

BASIS OF METHOD
 CF CASH FLOW
 A ACTIVITY

METHOD
 P PROBABILISTIC
 D DETERMINISTIC
 U UNDETERMINED

Some History

- 1994 CIM Reserves Definitions
- 1994 CIM Monograph No. 1 (blue book)
- 2002 Canadian Oil and Gas Evaluation Handbook (COGEH) Volume 1. Definitions, Practices and Procedures
- 2003 CIM Monograph No. 1. Second edition
- 2005 COGEH Volume 2. Detailed Guidelines
- ? COGEH Volume 3. Unconventional Reserves
- COGEH updates and revisions are planned on an ongoing basis.

Concepts of Disclosure

- FULL, TRUE, PLAIN
- NI 51-101 Oil and Gas Disclosure:
 - Value Concept
 - All Reserves and Resources
 - All hydrocarbons
- NI 51-102 Continuous Disclosure

Disclosed Product Types

Conventional

Light and Medium Crude Oil (combined):

Heavy Crude Oil

Natural Gas (excluding natural gas liquids):

Solution, Associated, Non-Associated Gas

Natural Gas Liquids:

Other By-Products: Sulphur, Helium, etc.

Unconventional

Coal bed methane

Bitumen, In-situ & mined

Synthetic oil

Shale oil

Methane hydrates

NI 51-101 Reserves

- Value Concept
- “Best Estimate” of the ultimate recovery:
Proved + Probable
- Measure of Uncertainty
 - Proved, Possible
 - Uncertainty is usually underestimated

NI 51-101 ANNUAL FILINGS

- F1 Statement of Reserves & Resources
- F2 Evaluators or Auditors Report
- F3 Management & Directors Report
 - Signed by:
 - CEO
 - Another Senior Officer,
 - Two Directors

Reserves Confidence Levels

		ENTITY	REPORTED
PROVED	1P	High degree of certainty	P90
+ PROBABLE	2P	Equally likely to be or not to be recovered	P50
+ POSSIBLE	3P	Unlikely to exceed the estimate	P10

NI 51-101 F1 Reconciliation

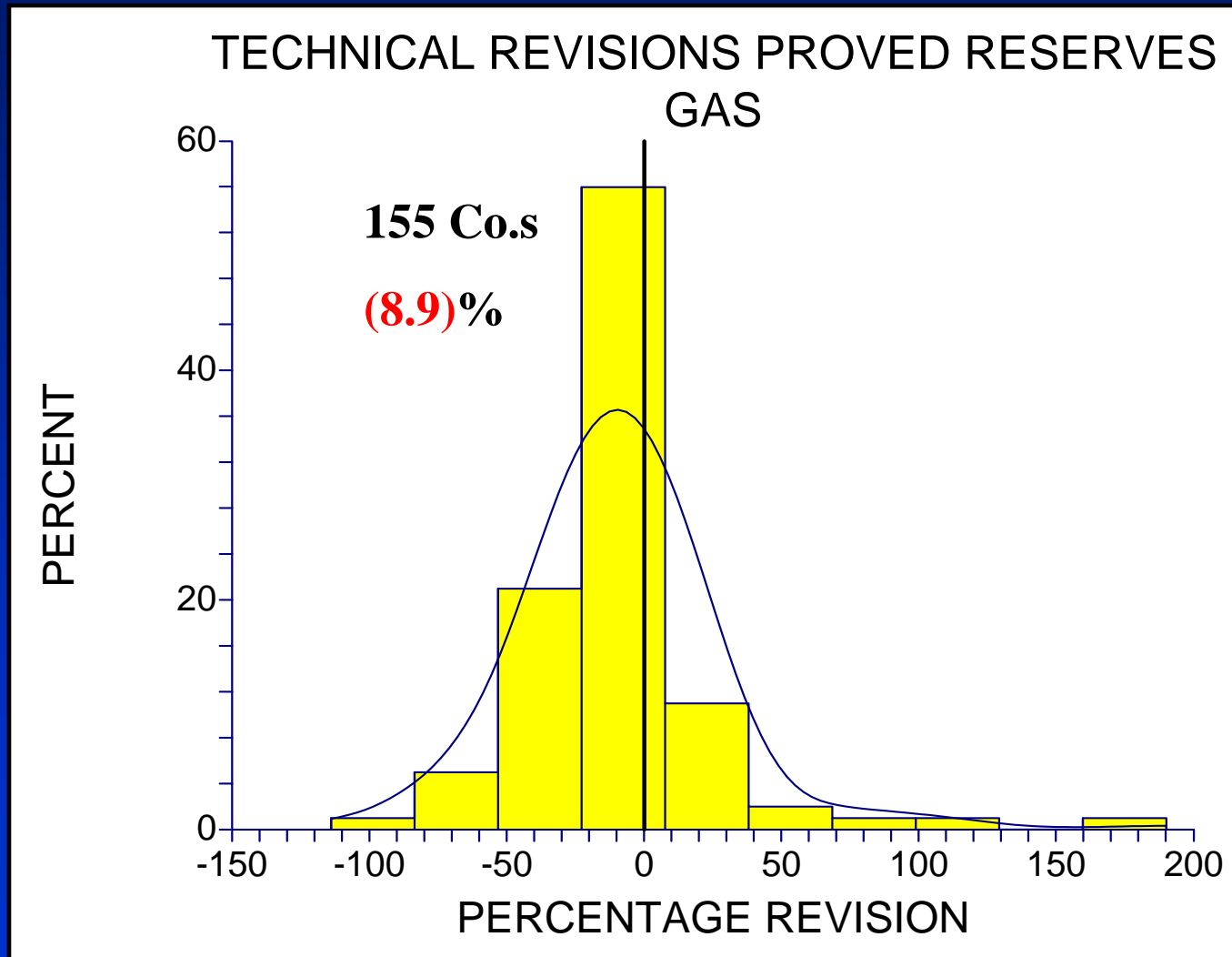
- OPENING BALANCE
- ADDITIONS
 - Discoveries
 - Improved Recovery
 - Infill Drilling
 - Acquisitions
- REDUCTIONS
 - Dispositions
 - Production
- FLUCTUATIONS
 - Economic Factors
 - **Technical Revisions**
- CLOSING BALANCE

Reserves Reconciliation

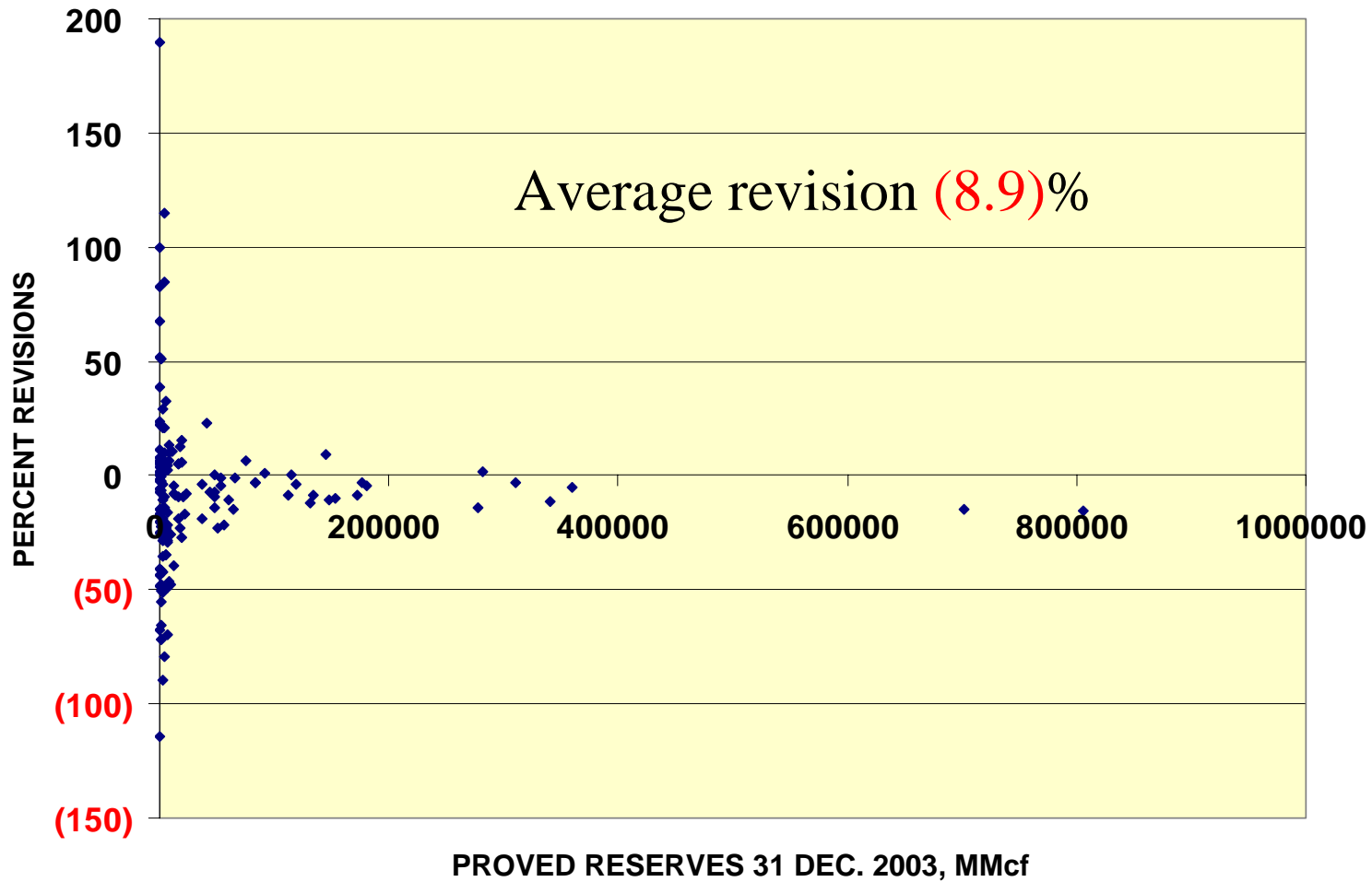
Technical Revisions

	2003 Average Technical Revisions Percent of Opening Reserves		
	Light & Medium Oil	Heavy Oil	Associated and Non- Associated Gas
	%	%	%
Proved	(5.3)	(19.7)	(8.9)
Proved + Probable	(0.4)	(14.9)	(4.3)
Number of companies	138	44	155

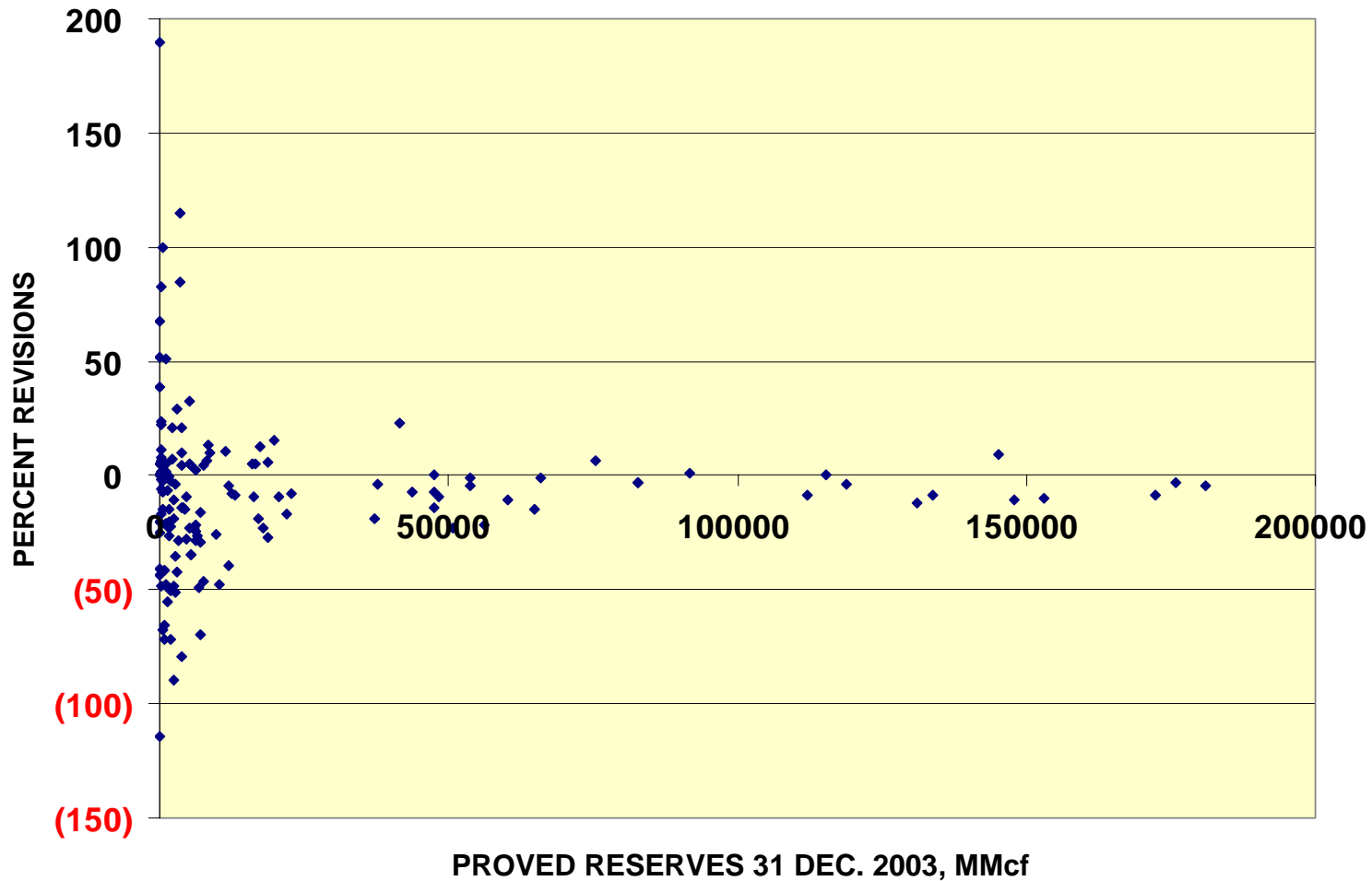
Proved Reserves Gas



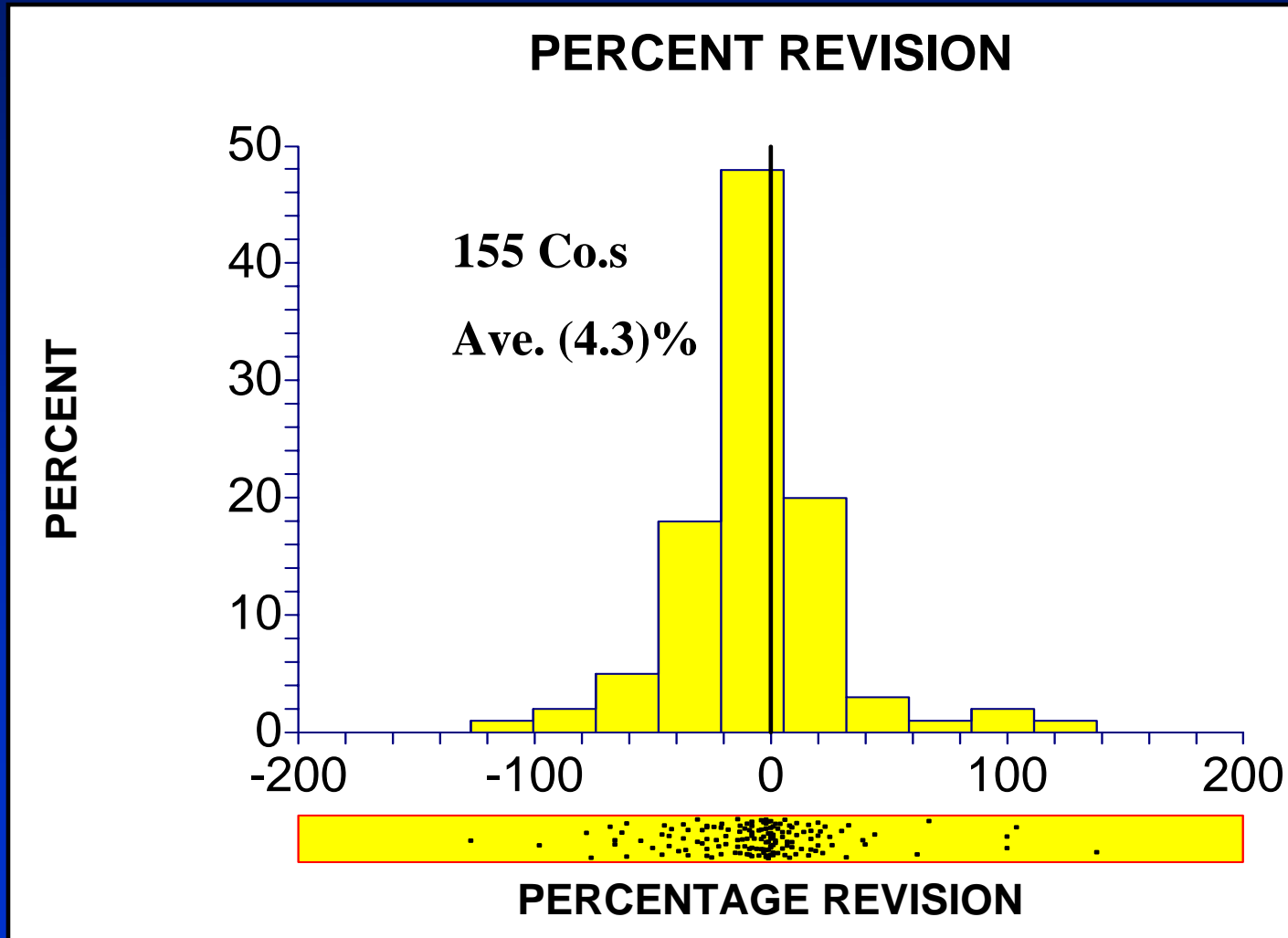
Proved Reserves Gas



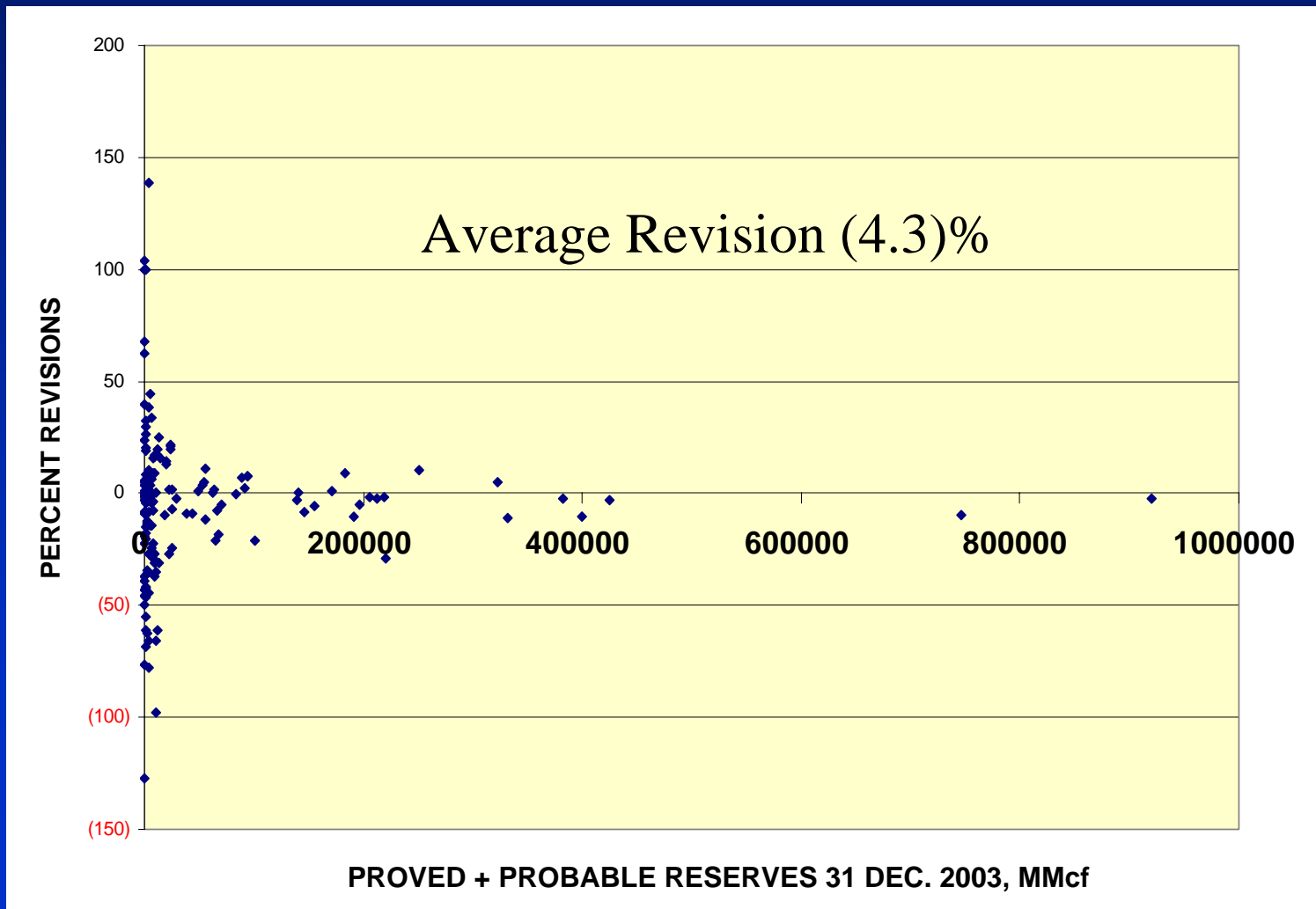
Proved Reserves Gas < 20,000 MMcf



Proved + Probable Reserves Gas



Proved + Probable Reserves Gas



Reserves Reconciliation Production

9 companies, 2396 wells, first 10 months of 2004

Average Ratio Actual: Forecast production

	Proved	Proved + Probable
Oil	91%	85%
Gas	97%	92%

Ideal Reserves Disclosure?

- What is the objective?
- Recognise that it is an estimation process:
 - Forecasting with limited data
 - Inherent uncertainty
 - Requires statistical concepts
- It's Science, not Art
- Reject the “we can't calculate it perfectly so it is impossible” viewpoint
- It's an ESTIMATE!

Measures

- Central Measures
 - Best estimate of the actual outcome is the **Mean**
 - Proved + Probable, P_{50} = Median
- Measures of uncertainty
 - Confidence Intervals
 - Proved, P_{90} ; Possible, P_{50} , Reserves
 - Variance (standard deviation)
- Resources: similar measures

Clarity in Definition

- Avoid qualitative definitions:
 - Reasonable certainty (SEC)
 - High degree of certainty (NI 51-101)
- Definition sets a TARGET for an ESTIMATE:
 - Estimated Reserves = Actual Reserves \pm Error \pm Bias
- Resolve the aggregation issue
 - Where do you want to be in the Portfolio?
 - Entity, property, company?

HOWEVER if you use Qualitative terms:

- Surveys show the general perception for terms similar to those used in SEC definitions is Median probabilities of:

Certain 97%

Likely 71%

Very Likely 88%

Performance Indicators

- For the Evaluator: Reconciliations
 - Technical Revisions
 - Production over the year
- For the Company & Investor:
 - Acquisitions, Dispositions, Extensions, etc.
 - Finding & Development Costs, Netbacks, Future Net Revenue, etc.

Technical Challenges

- Better understanding of reservoir geology
- Better understanding and use of statistical concepts and methods
- Production forecasting: Arps, 1944. Are we looking at the same type of reservoirs?
- Use of new methods
 - But, High Tech. \neq Greater Certainty

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How to Find More Information

- NI 51-101 and FAQ's
 - <http://www.albertasecurities.com/>
 - Hot Topics
 - Oil and Gas Disclosure Standards
- COGEH and Blue Book
 - <http://www.petsoc.org/>